

JUL 26 2007

**Patent**Customer No. 31561  
Docket No. 13464-US-PA  
Application No.: 10/711,380**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of

Applicant : Yen-Chang Tung  
Application No. : 10/711,380  
Filed : September 15, 2004  
For : VOLTAGE CONTROLLED OSCILLATOR WITH  
TEMPERATURE AND PROCESS COMPENSATION  
Examiner : CHANG, JOSEPH  
Art Unit : 2817

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**TRANSMITTAL LETTER**

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(Via fax: 1+ 9 pages)

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401 Dulany Street  
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Dear Sir,

In response to the Examiner's Answer dated May 30, 2007, please find the relevant paper as follows:

- Appellant's Reply Brief in (9) pages.

I believe that no fee is incurred. However, the Commissioner is authorized to charge any fees required in connection with the filing of this paper to account No. 50-2620 (Order No.: 13464-US-PA).

Thank you for your assistance in the subject matter. If you have any questions, please feel free to contact me.

Respectfully Submitted,  
JIANQ CHYUN Intellectual Property Office

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July 26, 2007

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## PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Examiner : CHANG, JOSEPH

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Group Art Unit : 2817

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Applicant : Yen-Chang Tung

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**For : VOLTAGE CONTROLLED  
OSCILLATOR WITH  
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) Attorney Docket: 13464-US-PA

**APPELLANT'S REPLY BRIEF**

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Dear Sir:

This is in response to Examiner's Answer dated May 30, 2007 under 37 C.F.R.41.41.

A careful analysis of the Examiner's answer ("the Answer") brings out many points to reply. The Answer stated, on page 6, that the left side of 16 is where the first current flows, the core of the voltage/current converter. The V-I converter is left side of dotted line, that is substantially the same structure as 210 of Figure 2A shown in the application and converts the input voltage  $V_{ref}$  into the output current (138). Therefore, current through left side of 16 of Jelinek is a first current passing through the

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USSN

voltage/current converter according to the input voltage" as recited in claim 1. The Answer further stated that "the second current source is current through right side of 16, not 14. The current source 14 of Jelinek has nothing to do with the scope of the claim."

Appellant respectfully traverse these assertions.

**Claim 1 Is Not Anticipated By The Jelinek**

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). For a prior art reference to anticipate a claim, the reference must disclose each and every element of the claim with sufficient clarity to prove its existence in the prior art. *Motorola, Inc v. Interdigital Tech. Corp.*, 121 F. 3d 1461, 43 USPQ 2d 1746, 1749 (Fed. Cir. 1991).

With respect to claim 1, the independent claim 1 recites the features as follows:

1. A voltage control oscillator, for outputting a clock signal with a frequency according to an input voltage, comprising:

*a constant current source, for providing a reference current;*

*a voltage/ current converter, coupled to the constant current source, for determining a first current passing through the voltage/ current converter according to the input voltage;*

*a current mirror, having a first current terminal and a second current terminal, the first current terminal being coupled to the constant current source, for determining a third current passing through the second current terminal according to the second current passing through the first current terminal, wherein the second current is the reference current subtracted by the first current; and*

an oscillating circuit, coupled to the second current terminal of the current mirror, for determining the frequency of the outputted clock signal according to the third current. (Emphasis Added)

Appellant respectfully submits that each and every element as set forth in the claim 1 is not found, either expressly or inherently described, in Jelinek et al. (U.S. Pat. No.5,331,295, "Jelinek" hereinafter).

Please refer to Fig. 2A of the present invention, a fixed current source CS, as claimed, is used to generate a fixed reference current I. The first current  $I_A$  is generated by the input voltage  $V_{COIN}$ , and the second current  $I_B$  is the reference current  $I$  subtracted by the first current  $I_A$ . The current mirror CM produces the third current  $I_C$  according to the second current  $I_B$ , and the third current  $I_C$  then flows into the oscillating circuit 230 to generate a clock signal with a specified frequency. The specified frequency is determined by the input voltage  $V_{COIN}$ , and the specified frequency is different from the theoretical frequency because of effects of temperature and process difference. That is, the frequency is not determined according to the uncertain effects of temperature and process difference because a problem of frequency drifting will occur by the effects of temperature and process difference.

In the present invention, a fixed reference current  $I$  is used to compensate the second current  $I_B$  and the third current  $I_C$ , and by such arrangement it could prevent form the problem of frequency drifting caused by effects of temperature and process difference. When effects of temperature and process difference cause the first current  $I_A$  to increase (i.e.  $I = I_A + I_B$ ), the second current  $I_B$  decreases. The third current  $I_C$  decreases according to the second current  $I_B$  (i.e.  $I_C$  is proportional to  $I_B$ ), so as to achieve the compensation. On the contrary, when effects of temperature and process

difference cause the first current  $I_A$  to decrease, the second current  $I_B$  increases. And the third current  $I_C$  increases according to the second current  $I_B$ , so as to achieve the compensation.

While in Figure 1 and 2 of the Jelinek., the fixed current sources 12 generates a fixed current (herein, denoting as  $I_{12}$ ), and the variable current source 14 generates a variable current (herein, denoting as  $I_{14}$ ). The current sum of left side current (herein, denoting as  $I_{16\_L}$ ) and right side current (herein, denoting as  $I_{16\_R}$ ) in the attenuator 16 is the fixed reference current  $I_{12}$  subtracted by the variable current  $I_{14}$  (i.e.  $I_{16\_L} + I_{16\_R} = I_{12} - I_{14}$ ). Thus, the total current flowing through the end 90 of the attenuator 16 is actually a variable current.

The Jelinek taught that "[T]he attenuator 16 compares the input voltage on node 20 to the reference voltage on node 104 so as to vary the second split current to drive ring oscillator 22 at the desired frequency. If the input voltage on node 20 is greater than the reference voltage on node 104, more current is drawn through N-channel transistor 94 than N-channel transistor 92 and thus the second split current is larger than the first split current. As a result, more current is drawn through P-channel transistor 108 and current mirror 110 as the input voltage increases, and the amount of current mirrored into ring oscillator 22 also increases." (See Col. 4, Lines 50-62), and "Conversely, as the input voltage on node 20 decreases, the second split current through N-channel transistor 94 decreases and, as a result, less current is drawn through P-channel transistor 108 and current mirror 110 and the current mirrored into ring oscillator 22 decreases. Thus, once the currents of the two current sources are combined and modulated by the attenuator, the resulting current through the right branch of the attenuator tracks the current needs of the current starved inverters of ring oscillator 22." (See Col. 4, Line 62- Col.5, Line 3).

The left side of the attenuator 16 is connected to the reference voltage  $V_{ref}$ , which is a fixed reference voltage, and the right side of the attenuator 16 is connected to the input voltage  $V_{filter}$ . In order to achieve compensation, the attenuator 16 compares the reference voltage  $V_{ref}$  and the input voltage  $V_{filter}$  to determine the current flowing through the left side and right side of the attenuator 16. When the reference voltage  $V_{ref}$  is smaller than the input voltage  $V_{filter}$ , the current  $I_{16\_L}$  flowing through the left side of the attenuator 16 is smaller than the current  $I_{16\_R}$  flowing through the right side of the attenuator 16. On the contrary, when the reference voltage  $V_{ref}$  is larger than the input voltage  $V_{filter}$ , the current  $I_{16\_L}$  flowing through the left side of the attenuator 16 is larger than the current  $I_{16\_R}$  flowing through the right side of the attenuator 16. Thus the compensation is achieved, and the frequency drift caused by effects of temperature and process difference is also prevented.

In view of the disclosure, it is the reason why the Jelinek put a variable current source 14. As stated in Col. 4, Lines 6-12, the Jelinek taught that “[S]econd current source 14 varies its output current proportionately with the strength of the P- and N-channel transistors in the circuit. This dependence enables the attenuator circuit 16, discussed next, to track the current needs of the current starved inverters in the ring oscillator 22 to generate a given frequency.” It is very clear that the variable current source 14 is necessary to achieve the compensation of the Jelinek invention.

Appellant respectfully submits that the total current flowing through the end 90 of the attenuator 16 is actually a variable current, and is not the “fixed current source CS, as claimed, used to generate a fixed reference current I of the present invention.” Appellant also respectfully submits that the assertion, in the Answer, that “current source 14 of the Jelinek has nothing to do with the scope of the claim” is not correct.

**Use of Prior Art in Rejections Where Operability Is in Question**

In determining that quantum of prior art disclosure which is necessary to declare an applicant's invention 'not novel' or 'anticipated' within section 102, the stated test is whether a reference contains an 'enabling disclosure'... ." *In re Hoeksema*, 399 F.2d 269, 158 USPQ 596 (CCPA 1968). The disclosure in an assertedly anticipating reference must provide an enabling disclosure of the desired subject matter; mere naming or description of the subject matter is insufficient, if it cannot be produced without undue experimentation. *Elan Pharm., Inc. v. >Mayo Found. For Med. Educ. & Research<*, 346 F.3d 1051, 1054, 68 USPQ2d 1373, 1376 (Fed. Cir. 2003) A reference contains an "enabling disclosure" if the public was in possession of the claimed invention before the date of invention. "Such possession is effected if one of ordinary skill in the art could have combined the publication's description of the invention with his [or her] own knowledge to make the claimed invention." *In re Donohue*, 766 F.2d 531, 226 USPQ 619 (Fed. Cir. 1985).

The Answer asserted that the present invention is the same as the reference of the Jelinek after removing the variable current source 14. Appellant respectfully traverse the assertion.

After removing the variable current source 14, it is believed that, in the Jelinek, **the total current flowing through the end 90 of the attenuator 16 is actually a variable current.**

In the present invention, how to achieve the compensation is stated above. After removing the variable current source 14 in the Jelinek, when the current I<sub>16\_R</sub> flowing through the right side of the attenuator 16 decreases, the current flowing into the ring oscillator also decreases. Thus, removing the variable current source 14 can not



achieve the wanted objects of the Jelinek, and it can not achieve the compensation of the present invention either. On the contrary, after removing the variable current source 14 in the Jelinek, when the current  $I_{16\_R}$  flowing through the right side of the attenuator 16 increases, the current flowing into the ring oscillator also increases.

Thus, removing the variable current source 14 can not achieve the desired objects of the Jelinek, and also can not provide an enabling disclosure of the desired subject matter of the present invention to achieve the compensation. In the present invention, when the first current  $I_A$  increases, the third current  $I_C$  flowing into the oscillating circuit 230 also decreases. Even if taking the reference voltage  $V_{ref}$  as input voltage in the Jelinek after removing the variable current source 14, the Jelinek does not teach the connection of the VCO to achieve the compensation.

CONCLUSION


It is concluded that all of the features of claim 1 are not anticipated by the reference of the Jelinek. Rejection addressed to claims 1, 3, 4, and 16 under 35 U.S.C. 102(b) should be traversed. If independent claim 1 is allowable over the prior art of record, then its dependent claims 3, 4 and 16 are allowable as a matter of law, because these dependent claims contain all features of their respective independent claim 1. *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988).

Further in view of the reasons set forth above, rejection to claims 2, and 5-15 under 35 U.S.C 103(a) should also be traversed.

A decision directing the Examiner to issue a Notice of Allowance is respectfully requested.

Respectfully submitted,

Date: *July 26, 2007*

  
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